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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

KASTURE, DNYANESH G

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/530,077	Applicant(s) BORTOLI ET AL.	
	Examiner DNYANESH KASTURE	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 July 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 April 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to 37 CFR 1.132 Affidavit

1. The affidavit under 37 CFR 1.132 filed on 29 July 2009 is insufficient to overcome the rejection of claim 1 based upon Black as set forth in the last Office action because the analysis of the different zones over the valve surface was done to demonstrate the distribution of STRESS and not FORCES as claimed. Stress and Force are very different variables because Stress is defined as Force PER UNIT AREA. See the Response to Arguments section later in this office action.

Claim Rejections - 35 USC § 102

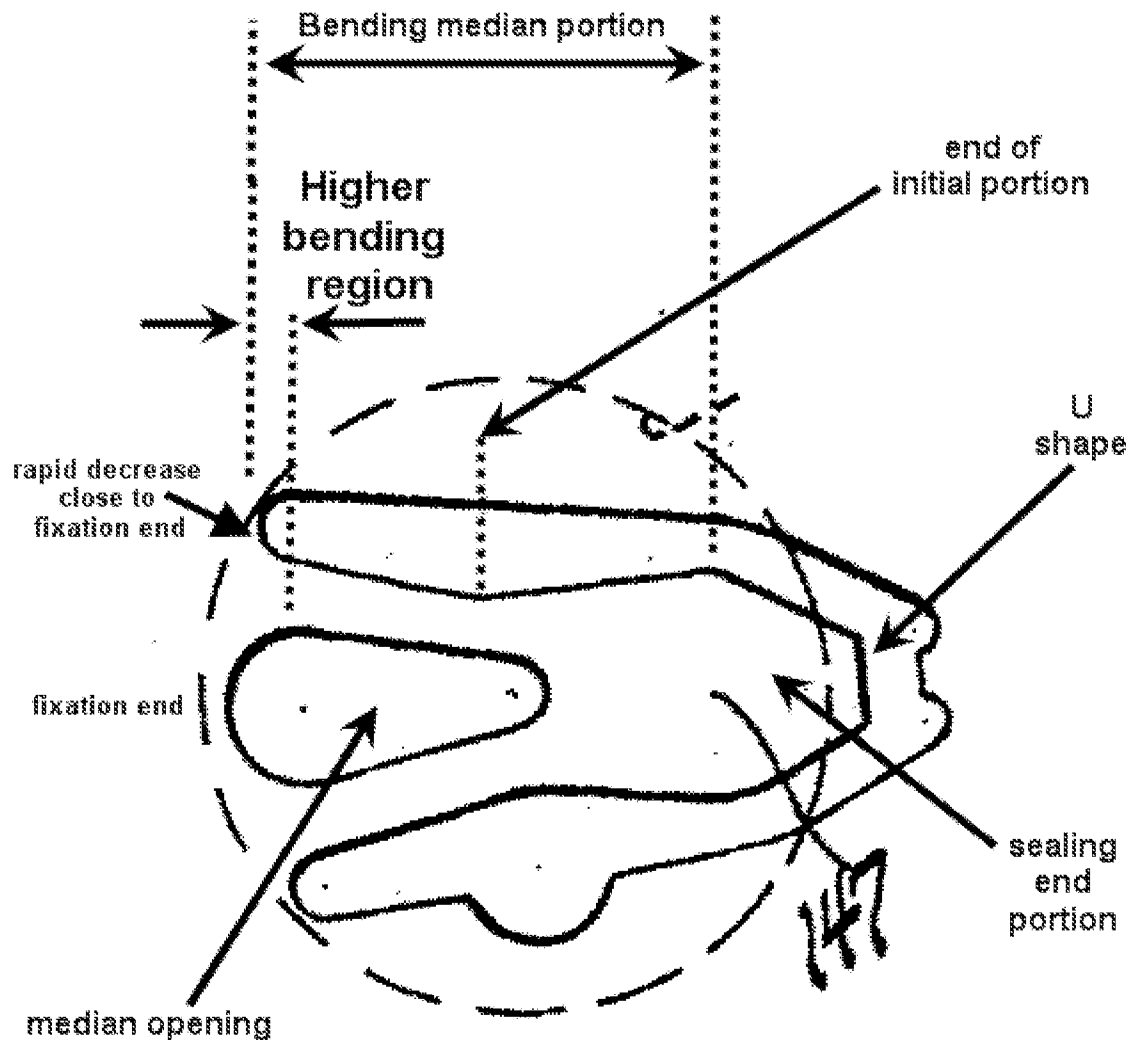
2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1, 2, 5 and 9 are rejected under 35 U.S.C. 102(b) as being anticipated by Black et al (US Patent 4,061,443 A) and as extrinsically evident from Shigley et al (Non Patent Literature: "Mechanical Engineering Design", Page 969)

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4. In Re claim 1, with reference to Figure 5 depicted above, Black et al discloses a suction valve (147) with a compression cylinder (165), which has one end closed by a valve plate (77), said valve comprising a flexible vane shaped to present:

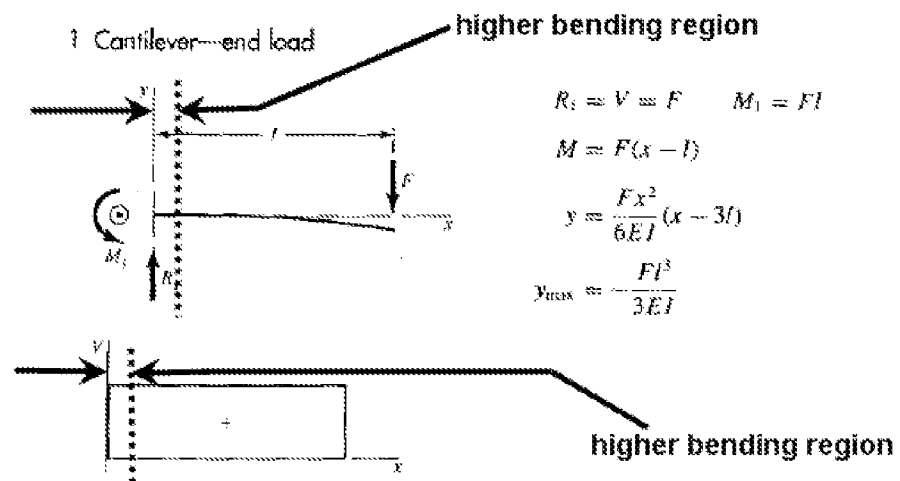
- a fixation end portion (as depicted)

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- a bending median portion (as depicted) provided with a median opening (as depicted) aligned with a discharge orifice (149) and a sealing end portion (as depicted) operatively associated with a suction orifice (145) provided in the valve plate (77)
- wherein the distance between an external edge of the flexible vane and its adjacent internal edge portion of the median opening diminishes progressively along a higher bending region from a maximum value close to end fixation portion to a minimum value at the close to the boundary of the higher bending region (as depicted above)

Table A-9

Shear, Moment, and Deflection of Beams
(Note: Force and moment reactions are positive in the directions shown; equations for shear force V and bending moment M follow the sign conventions given in Sec. 4-2.)



- with reference to Shigley et al, Table A-9 above depicts a cantilever (flexible vane) under end load (force due to suction in an open position of the vane). As evidenced from the shear force diagram, the shear force (V) resulting from the opening of the valve is uniformly distributed along the higher bending region NO MATTER HOW SMALL the higher bending region is. Further, as evidenced from the deflection (y) diagram, the deflection of the vane (y) is NOT a linear function of (x) implying that the vane has a curved shape in the higher bending region NO MATTER HOW SMALL the

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higher bending region is. Therefore the vane IS bent in the higher bending region (due to its curved shape)

- the bending median portion and sealing end portion presents a U shape (as depicted)
- legs of the U shape are symmetrical about a longitudinal axis of the vane, they are equal length, and are united by the fixation end portion (as depicted, the fixation end is part of the fixation end portion)

5. In Re claim 2, Black et al discloses that the width of the median opening increases progressively from a region adjacent to the fixation end portion to the opposite boundary of the higher bending region (as depicted), whereas the total width of the flexible vane diminishes from the fixation end portion to the end of the initial portion as depicted and then it begins to progressively increase towards the sealing end portion. With regards to “from before the opposite boundary”, when the point of reference is the tip of the U shape, the end of the initial portion is “before” the “opposite boundary of the higher bending portion”.

6. In Re claim 5, Black et al discloses the distance between the external and internal edges diminishes more rapidly close to the fixation end portion than along the rest of the higher bending region.

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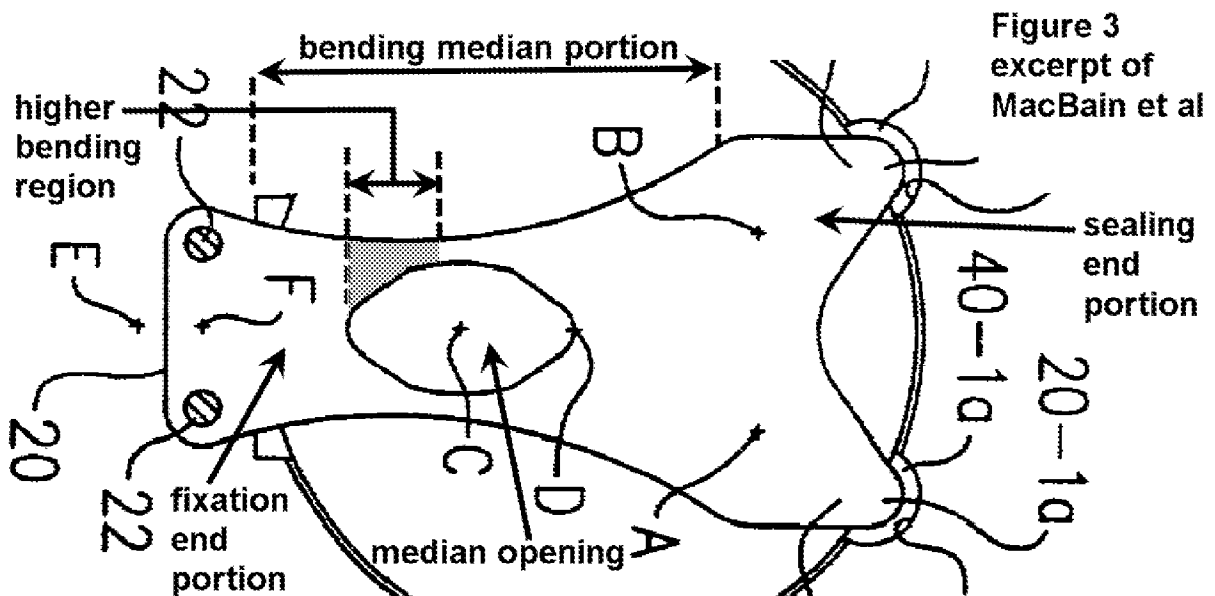
7. In Re claim 9, Shigley et al discloses that the shear force is transmitted to the entire vane since it is formed in one piece, therefore the opening forces are not concentrated in any region.

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

9. ALTERNATIVELY, Claims 1 – 4, 9 are rejected under 35 U.S.C. 102(e) as being anticipated by MacBain et al (PG Pub US 20030068245 A1, filing date: October 5, 2001)

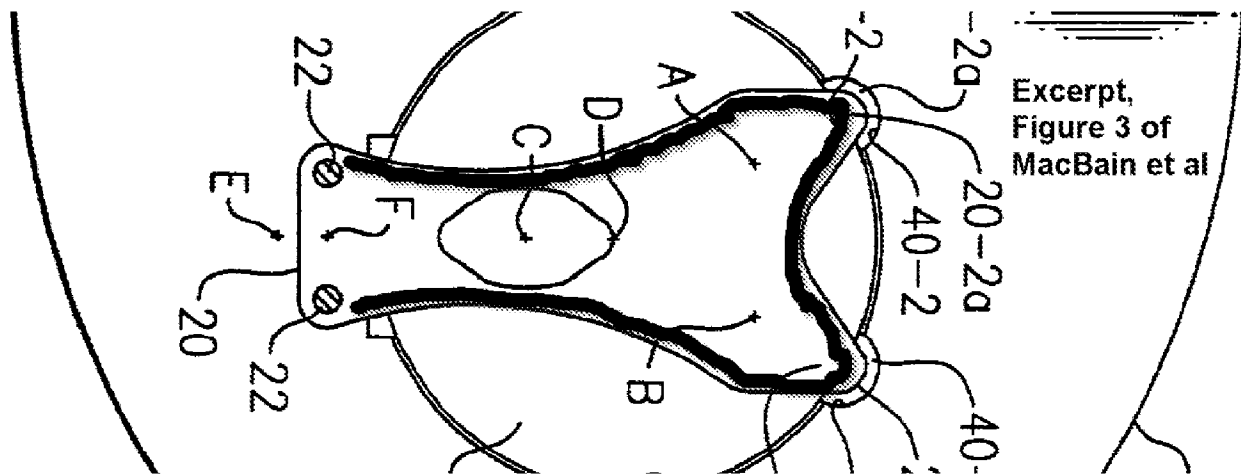


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10. In Re Claim 1, with reference to Figure 3 annotated above, MacBain et al discloses a suction valve for a small hermetic compressor (Abstract states “compressor suction valve”) of the type presenting a compression cylinder (D) which has an end closed by valve plate (30), said valve comprising:

- a fixation end portion (annotated) to be affixed to the valve plate;
- a bending median portion (annotated) provided with a median opening (annotated) aligned with a discharge orifice (see Figure 1); and
- a sealing end portion (annotated) operatively associated with the suction orifice provided in the valve plate,
- wherein the distance between an external edge of the flexible vane and its adjacent internal edge portion of the median opening diminishes, along a higher bending region (as annotated by the shaded area, the width of which decreases along the higher bending region) of the flexible vane of the valve, from a maximum value, close to the end fixation portion, to a minimum value, close to the boundary of the higher bending region of the flexible vane,
- wherein the flexible vane is configured to distribute opening forces along the higher bending region (no areas of stress concentration) allowing the flexible vane to be bent along the higher bending region in an open position, and
- the bending median portion and sealing end portion “presents” a U shape as annotated below, with the legs being symmetrical about a longitudinal axis of the flexible vane, are of equal length and are united by the fixation end portion as depicted

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(Note that the limitation “presenting” could also be broadly interpreted as enclosing a U shape, since the outline is not being claimed as U shaped. Further, the “united by” limitation could be interpreted as bringing the two legs together.)

11. In Re Claim 2, the width of the median opening increases as the total width of the vane decreases. The end of the initial portion is near the center of the median opening.

12. In Re Claim 3, as depicted, the median opening has a substantially semi elliptical contour as depicted.

13. In Re Claim 4, the median opening has an elongated oval (egg) shape.

14. In Re Claim 9, the stress is not concentrated in the region of the bending median portion that is adjacent to the fixation end portion.

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Claim Rejections - 35 USC § 103

15. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

16. Claims 3, 4 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent 4,061,443 A) in view of Ikeda et al (US Patent 4,764,091 A)

17. In Re claim 3, Black et al as applied to claim 2 discloses all the claimed limitations except for the median opening presenting a substantially semi-elliptical contour with its vertex tangent to the fixed end portion.

18. However, Ikeda et al discloses a semi-elliptical contour of the median opening along the higher bending region with its vertex being tangent to the fixation end portion.

19. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the contour of the median opening of Black et al along the higher bending region so it has a semi-elliptical shape as taught by Ikeda et al as an alternative design choice for the shape of the median opening in the higher bending region.

20. In Re claim 4, Black et al discloses that the median opening has a “substantially oval” contour as depicted.

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21. In Re claim 8, Ikeda et al discloses a gap that is larger at the fixed end of the vane than its apex.

22. Claims 6 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent 4,061,443 A)

23. In Re claim 6, Black et al as applied to claim 1 discloses the claimed limitations except for the length of the higher bending region being 50 %. It would have been obvious to a person having ordinary skill in the art at the time of the invention to choose a value of 50 % since it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art - MPEP 716.02 (b) [R2].

24. In Re claim 7, Black et al as applied to claim 1 discloses all the claimed limitations except for the polynomial shape as claimed. Note that fitting a polynomial to form a smooth curve along a set of data points is a well known statistical technique. In addition, applicant has stated that it is within the capability of a person skilled in the art to determine the coefficients of the polynomial from rigidity and bending parameters.

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25. Alternatively, claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Black et al (US Patent 4,061,443 A) and in view of Kandpal (US Patent 5,266,016 A)

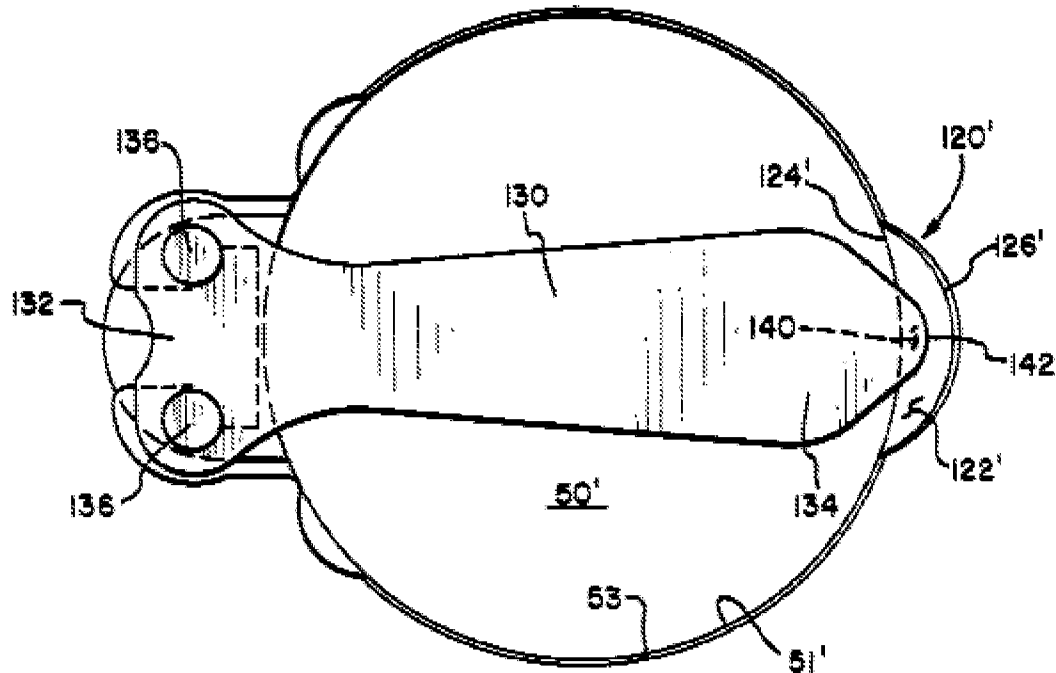


FIG. 4

26. In Re claim 2, Black et al discloses that the width of the median opening increases progressively from a region adjacent to the fixation end portion to the opposite boundary of the higher bending region (as depicted), whereas the total width of the flexible vane diminishes from the fixation end portion to the end of the initial portion as depicted and then it begins to progressively increase towards the sealing end portion.

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27. However, Black et al does not disclose “from before the opposite boundary”, when the point of reference is the base at the fixed end.

28. Nevertheless, Kandpal discloses that the total width decreases at first but then progressively increases “from before the opposite boundary of the higher bending region”.

29. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the contour of the vane of Black et al so that the width progressively increases “from before the opposite boundary of the higher bending region” as taught by Kandpal as an alternative design choice for the contour of the vane.

Response to Arguments

30. Applicant has argued that Black et al does not exhibit a uniform distribution of forces, but rather exhibits a concentration of high Von Mises stresses.

31. Examiner’s Response: The distribution of STRESS has not been claimed, in fact “stress” has not been mentioned at all anywhere in Claim 1. Stress and Force are very different variables because Stress is defined as Force PER UNIT AREA. The claim clearly states “distribute opening FORCES” and not stresses. Simply claiming “configured to distribute opening forces” does not limit the stress in the higher bending region. Also, the nature of the distribution has not been stated – for instance; the forces

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can be distributed uniformly or non-uniformly. Further, addressing the argument “uniform distribution of forces”, the word “uniform” is also not in the claim. Additionally, the phrase “allowing the flexible vane to be bent” in the claim is an intended purpose / functional limitation - which is met because there is nothing that prevents Black et al's vane from being bent.

32. With regards to newly added Claim 9, the phrase "opening forces are not concentrated in a region", (as mentioned in the previous office action) the shear FORCE resulting from the opening of the valve is uniformly distributed along the higher bending region NO MATTER HOW SMALL the higher bending region is. Therefore Black et al still reads on this claim. It appears applicant's intent was to claim that STRESSES are not concentrated in a region (lower stress concentration).

33. Applicant's argument has been carefully considered but it is not persuasive for the reasons above. The examiner therefore respectfully disagrees with applicant's arguments.

Conclusion

34. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

DGK